

IN THE CLAIMS:

Claim 1 (currently amended) ~~A~~ In a method of steam cracking hydrocarbons, wherein ~~which~~ ~~method consists in heating~~ a mixture of hydrocarbons and steam is heated to a desired temperature that is high enough to crack the hydrocarbons and transform them into olefins, the improvement comprising supplying ~~method being characterized in that~~ the source of energy needed for heating the mixture ~~is supplied~~ essentially by cogeneration using combustion of a fuel to produce simultaneously both heat energy and mechanical work which is transformed into electricity by an alternator or an electricity generator, ~~and in that~~ wherein the mixture is initially subjected to preheating using the heat energy supplied by the cogeneration, and is subsequently heated to the desired cracking temperature by means of electrical heating using the electricity supplied by the cogeneration.

Claim 2 (currently amended) A method according to claim 1, wherein ~~characterized in that~~ the cogeneration uses a fuel selected from at least one of the cracked hydrocarbons, ~~preferably one or more alkanes in the range C₁ to C₄.~~

Claim 3 (currently amended) A method according to claim 1, wherein ~~characterized in that~~ the fuel is a gaseous hydrocarbon fuel, ~~preferably comprising one or more gaseous alkanes.~~

Claim 4 (currently amended) A method according to claim 1, wherein ~~characterized in that~~ the mechanical work is produced by a heat engine, or a gas engine, ~~or preferably a gas turbine.~~

Claim 5 (currently amended) A method according to claim 1, ~~characterized in that~~ wherein the cogeneration produces heat energy in the form of hot combustion gases at a temperature lying in the range 400°C to 570°C, ~~and preferably in the range 470°C to 550°C.~~

Claim 6 (currently amended) A method according to claim 1, ~~wherein characterized in that~~ the cogeneration produces the heat energy in the form of hot combustion gases, with a fraction of the oxygen thereof being used as oxidizer for performing post-combustion and increasing the heat energy used for preheating the mixture to be cracked.

Claim 7 (currently amended) A method according to claim 6, ~~wherein characterized in that~~ the post-combustion provides exhaust gases having a temperature lying in the range 500°C to 1100°C, ~~and preferably in the range 550°C to 800°C.~~

Claim 8 (currently amended) A method according to claim 7, ~~wherein characterized in that~~ the heat of the exhaust gases is exchanged simultaneously with water or steam in one or more boilers to produce steam at low or medium pressure.

Claim 9 (currently amended) A method according to claim 1, ~~wherein characterized in that~~ electrical heating is performed by induction heating.

Claim 10 (currently amended) A method according to claim 9, ~~wherein characterized in that~~ induction heating is performed at high frequency (HF).

Claim 11 (currently amended) A method according to claim 1, ~~wherein characterized in that~~ the electrical heating is performed by the Joule effect.

Claim 12 (currently amended) A method according to claim 11, ~~wherein characterized in that~~ the Joule effect heating is performed using a resistance element tube in which the mixture for cracking flows.

Claim 13 (currently amended) A method according to claim 1, ~~wherein characterized in that~~ ultrasound waves are applied to the mixture of hydrocarbons and steam during cracking.

Claim 14 (currently amended) A method according to claim 13, ~~wherein characterized in that~~ an ultrasound wave generator is used that is powered by electricity supplied by the cogeneration.

Claim 15 (original) Hydrocarbon steam cracking apparatus comprising:

i) a cogenerator system comprising a gas turbine (1) connected to a line (2) for supplying it with air or oxidizer, to a line (3) for feeding it with fuel, and to at least one exhaust line (9) for exhausting hot combustion gases from the gas turbine (1), the turbine itself being coupled to at least one alternator or electricity generator (4) connected to at least one electrical line (8);

ii) at least one preheating chamber (14) for preheating a mixture of hydrocarbons and steam, the chamber being connected to at least one of the lines (9) for evacuating hot combustion gases and having at least one line (12) passing therethrough for transporting said

mixture and enabling heat to be exchanged therewith;

iii) at least one electrical heater apparatus for heating at least one cracking tube (6) connected to at least one of the transport and heat exchange lines (12) leaving the chamber (14), and at least one drawing-off line (16) for drawing off cracked hydrocarbons, said electrical heater apparatus being connected to at least one of the electrical lines (8); and

iv) at least one zone (17) for separating and purifying the cracked hydrocarbons, said zone being connected to at least one of the drawing-off lines (16).

Claim 16 (currently amended) Apparatus according to claim 15, wherein ~~characterized in that~~ the electrical heater apparatus comprises at least one induction heater tube.

Claim 17 (currently amended) Apparatus according to claim 15, wherein ~~characterized in that~~ the electrical heater apparatus is apparatus for Joule effect heating.

Claim 18 (currently amended) Apparatus according to claim 17, wherein ~~characterized in that~~ the Joule effect heater apparatus comprises one or more resistance element tubes in which the mixture for cracking flows.

Claim 19 (currently amended) Apparatus according to claim 15, wherein ~~characterized in that~~ it comprises at least one post-combustion chamber (10) placed on at least one of the lines (9) for evacuating combustion gases from the gas turbine (1) and fed by a fuel feed line.

Claim 20 (currently amended) Apparatus according to claims 15, ~~wherein characterized in that~~ the zone (17) for separating and purifying the cracked hydrocarbons comprises at least one drawing-off line (19) for drawing off at least one cracked hydrocarbon, and in that said drawing-off line (19) has at least one recovery line (5) running therefrom for recovering at least one cracked hydrocarbon and connected to at least one of the lines (3) for feeding fuel to the gas turbine (1).

Claim 21 (currently amended) Apparatus according to claim 19, ~~wherein characterized in that~~ the cracked hydrocarbon separation and purification zone (17) comprises at least one drawing-off line (19) for drawing off at least one cracked hydrocarbon, and in that said at least one drawing-off line (19) has at least one recovery line (5) running therefrom for recovering at least one cracked hydrocarbon and connected to the line for feeding at least one of the post-combustion chambers (10).

Claim 22 (new) A method according to claim 1, wherein the cogeneration uses a fuel selected from one or more alkanes in the range C_1 to C_4 .

Claim 23 (new) A method according to claim 1, wherein said fuel comprises one or more gaseous alkanes.

Claim 24 (new) A method according to claim 1, wherein the cogeneration produces heat energy in the form of hot combustion gases at a temperature lying in the range 470°C to 550°C.

Claim 25 (new) A method according to claim 9, wherein the post-combustion provides exhaust gases having a temperature lying in the range 550°C to 880°C.